

DPSS laser – **NUCLEON™** the future is wearable

Rapid growth of laser applications for material processing in all leading industries was driven during the last decade by a fundamental technological transformation toward product miniaturisation. All laser system manufacturers were forced to achieve smarter and compacter designs to take into account industrial space limitations for increasing laser installations – while expectations continuously grew for performance, lifetime, reliability, and simplicity.

Driving the future

Pure air-cooled, diode-pumped, high-power ND:YAG laser marking systems were pioneered by **Compact Laser Solutions (CLS)** back in the mid 1990s. Since then, the company has opened entirely new markets and applications. CLS technology now represents state-of-the-art design. Now, 10 years after these pioneering efforts, CLS is again ready to move the industry forward, by rolling out the very first handheld generation of high-power Neodymium DPSS laser systems. The launching of the internationally patented **NUCLEON™** product series at LASER 2005 in Munich will move current technology beyond the limits of today's product architectures. The reliability of these systems, designed for industrial field applications, sets a new standard.

Meeting the needs of industry

The launch of the **NUCLEON™** product family includes the infrared (1064 nm), Q-switched marking and precision-machining device **PERPETUUM™**, which outputs up to 10-W continuous wave (CW) pulse repetition rates from 1 Hz to 50 kHz, with pulse length in the nano-second range. The frequency doubled version (532 nm), the **RAPIDUS™**, provides up to 5-W CW, and operates Q-switched with up to 30 kHz repetition rates in the nano-second pulse length range. The beam quality of both models is a fundamental TEM00 mode output, for near diffraction limited focussing.

The **NUCLEON™** series additionally contains an ultra-compact, mobile 5-W CW in TEM00 mode, frequency doubled green (532 nm) enhanced beam source.

The applications are many and various. They include micromachining and marking, surface as well as subsurface (for transparent materials, e.g. glass) engraving, non-destructive testing, cutting and trimming, laser ablation and OPO pumping, forensic applications, and uses involving pumping titanium-sapphire lasers.

The revolutionary nano-design makes it remarkably simple to integrate these robust laser systems into all existing production lines and units, as well as those expected in the future. Integration limitations in industrial applications will disappear, owing to highly compact total system outer dimensions smaller than a DIN A4 sheet and total weight under 6 kg. With pump-diode rates in excess of typically 12,000 hours and practically maintenance-free pure air-cooling design, laser downtimes achieved will break all known performance barriers, including those for cost-effectiveness.

Advancing the frontiers

No-limit mobility will result in a paradigmatic shift: – ***laser to object instead of object to laser.***

In addition to the stationary industrial version of the **NUCLEON™** product family, Compact Laser Solutions will release its pure mobility range. By virtue of their unique concept, all **NUCLEON™** versions will be available as wearable, battery-powered handheld devices. The rechargeable battery package in a size of a human fist, continuously generates a 5-W (CW) green laser beam (532 nm) up to 1 hour, resulting in several hours of processing-time use in production practises.

Most industries see wearable technology as a way to create service differentiation, attract and retain top performance, increase productivity – and redesign business processes. This new mobility will lead to innovative, as yet unknown applications for the laser processing of materials.